

## WHAT IS CLAIMED IS:

1. A magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers and having a principal surface nearer to said second magnetic layer than said first magnetic layer, said principal surface of the spacer layer having a surface roughness  $R_a$  which is not greater than a thickness of said spacer layer, where  $R_a$  is representative of a center-line-mean roughness.

2. A magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers and having a principal surface nearer to said second magnetic layer than said first magnetic layer, said principal surface of the spacer layer having a surface roughness  $R_a$  which is not greater than 0.5 nm, where  $R_a$  is representative of a center-line-mean roughness.

3. A magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers, said substrate surface of the disk substrate having a surface roughness  $R_a$  which is not greater than a thickness of said spacer layer, where  $R_a$  is representative of a center-line-mean roughness.

4. A magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers, said substrate surface of the disk substrate having a surface roughness  $R_a$  which is not greater than 0.5 nm, where  $R_a$  is representative of a center-line-mean roughness.

5. A magnetic disk as claimed in any one of claims 1 through 4, wherein said spacer layer is made of a high-melting-point material higher in melting point than a material of any one of said first and said second magnetic layers.

6. A magnetic disk as claimed in any one of claims 1 through 4, wherein each of the first and the second magnetic layers has an epitaxial relationship with the spacer layer.

7. A magnetic disk as claimed in any one of claims 1 through 4, wherein the exchange coupling film causes antiferromagnetic coupling.

8. A method of producing a magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers, said method comprising the steps of:

preliminarily obtaining a relationship between a surface roughness of the substrate surface of said disk substrate and attenuation owing to thermal fluctuation when a signal is recorded on said magnetic disk;

determining a desired surface roughness of the substrate surface of said disk substrate with reference to said relationship so that the attenuation of said signal has a desired level;

producing the disk substrate having the substrate surface which has the desired surface roughness; and

forming the exchange coupling film on the substrate surface of the disk substrate which has the desired surface roughness.

9. A method of producing a magnetic disk comprising a disk substrate having a substrate surface and an exchange coupling film on said substrate surface, said exchange coupling film comprising a first magnetic layer, a second magnetic layer farther from said substrate surface than said first magnetic layer, and a spacer layer interposed between said first and said second magnetic layers and having a principal surface nearer to said second magnetic layer than said first magnetic layer, said method comprising the step of:

depositing said spacer layer by sputtering so that said principal surface of the spacer layer has a surface roughness  $R_a$  which is not greater than a thickness of said spacer layer, where  $R_a$  is representative of a center-line-mean roughness.

10. A method of producing a magnetic disk as claimed in claim 9, wherein said spacer layer is deposited by sputtering at a deposition rate within a range not higher than 1.2 nm/sec.